

## REMARKS

Claims 1-12 are pending in the present Application.

I. The obviousness rejections of claims 1 and 8 based on Conley (US 2004/0203254), as noted on page 3 of the Office Action.

The USPTO respectfully rejects claims 1, 8, and 10-11 under 35 U.S.C. § 102(e) as being anticipated by Conley. Claims 1 and 8 are independent claims.

A. Conley does not teach or suggest that the insulating film has a thickness in the range of 0.3 to 2 nm, as claimed in claims 1 and 8.

Claim 1 claims in relevant part:

“forming an insulating film in a semiconductor device, wherein the insulating film has a thickness **in the range of 0.3 to 2 nm.**” (emphasis added)

Claim 8 similarly claims a range of 0.5 to 2 nm. Regarding these limitations, it is respectfully not seen where Conley discloses the claimed structure quoted above.

For example, the USPTO respectfully notes on page 3 of the Office Action that **“Conley does not show the specific insulating film thickness range as claimed in claims 1 and 8.”**

The USPTO respectfully attempts to overcome this deficiency in Conley by arguing on pages 3 and 5 of the Office Action that Conley teaches a thickness of less than two monolayers to 5 nm, and cites the *In re Peterson* case and MPEP 2144.05.

Applicants are respectfully aware of the holding of the *Peterson* case as described in the MPEP. However, even assuming *arguendo* that Conley does teach a broader range than the range claimed in claims 1 and 8, **it is respectfully important to note that MPEP 2144.05.III further notes that “Applicants can rebut a *prima facie* case of obviousness based on overlapping ranges by showing the criticality of the claimed range.”**

As explained in detail on pages 6-8 of the present specification, **impurities cannot be reliably removed from a film when the thickness exceeds 2.0 nm** (see also present Figures 2(A)-4(B)). In other words, in the method of Conley, which includes thicknesses greater than 2.0 nm, impurities may not be reliably removed. In other words, limiting the thickness of the insulating film to the specifically claimed ranges of claims 1 and 8 results **better removal of**

**impurities** than in conventional methods. These results are novel and unexpected because, as described on pages 1-2 of the present specification, conventional methods of removing impurities result in undesirable formation of an interface layer. Thus, **this illustrates the “criticality” of the specifically claimed ranges of claims 1 and 8.** Therefore, **because the specifically claimed ranges of claims 1 and 8 are “critical,” a prima facie case of obviousness based on overlapping ranges is rebutted, as indicated in MPEP 2144.05.III**

Thus, in summary, Conley respectfully does not teach or suggest the “critical” specifically claimed range of claims 1 and 8.

In contrast, present Figure 6 illustrates one possible embodiment of the claimed structure quoted above. For example, at step 11 of present Figure 6, the insulating film is formed. **As explained on page 8, lines 5-10 of the present specification, the thickness of the insulating film is up to 2.0 nm.** In other words, the insulating film has a thickness in the range of 0.3 to 2 nm or in the range of 0.5 to 2 nm, as claimed in claims 1 and 8.

Thus, it is respectfully asserted that Conley does not teach or suggest all of the limitations of claims 1 and 8. Therefore, it is respectfully asserted claims 1 and 8 are not obvious over Conley.

#### **B. The dependent claims.**

As noted above, it is respectfully asserted that independent claims 1 and 8 are allowable, and therefore it is further respectfully asserted that dependent claims 10 and 11 are allowable.

### **II. The obviousness rejections of claims 2-7, 9, and 12 based on Conley in view of Colombo (US 2005/0136690), as noted on page 4 of the Office Action.**

The USPTO respectfully rejects claims 2-7 and 9 under 35 U.S.C. § 103(a) as being unpatentable over Conley in view of Colombo. Claim 9 is an independent claim.

#### **A. The cited references do not teach or suggest that the insulating film has a thickness in the range of 0.3 to 2 nm, as claimed in 9.**

Claim 9 claims in relevant part:

“forming an insulating film in a semiconductor device, wherein the insulating film has a thickness **in the range of 0.3 to 2 nm.**” (emphasis added)

Regarding these limitations, it is respectfully not seen where Conley discloses the claimed structure quoted above.

For example, as respectfully noted above in Section I regarding independent claims 1 and 8, **Conley does not teach or suggest forming an insulating film with a thickness in the specifically claimed range of 0.3 to 2 nm.** Additionally, it is respectfully asserted that Colombo does not overcome this deficiency in Conley. For example, it is respectfully asserted that **Colombo does not teach or suggest anything about the thickness of the insulating film.**

Therefore, it is respectfully asserted that the cited references, taken either alone or in combination, do not teach or suggest all of the limitations of independent claim 9. Therefore, it is respectfully asserted that claim 9 is not obvious over the cited references.

#### **B. The dependent claims.**

As noted above, it is respectfully asserted that independent claims 1 and 9 are allowable, and it is further respectfully asserted that Colombo does not overcome the deficiencies in Conley noted above in Section II regarding independent claim 1. Therefore it is further respectfully asserted that dependent claims 2-7 and 12 are also allowable.

### III. Conclusion.

It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable. Accordingly, reconsideration and allowance of all of the claims is respectfully requested.

Please contact the undersigned for any reason. Applicants seek to cooperate with the Examiner, including via telephone if convenient for the Examiner.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130.

Respectfully submitted,

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